

CHAPTER I

PRELIMINARY

1.1. Background of the Problem

Indonesia currently uses the 2013 curriculum based on a scientific approach as its educational curriculum. The 2013 curriculum based on a scientific approach is a curriculum that emphasizes the modern pedagogic dimension of learning using a scientific approach. In this curriculum, the focus of learning is on the process, not on the material/content. In addition, the teaching rights previously owned by educators shifted to students. This shows that it is the students who will learn, while the teacher's role is as a facilitator, not an expert (Musfiqon and Nurdyansyah, 2015).

Scientific approach is an approach that emphasizes inductive reasoning, where students are expected to be able to see specific phenomena to then draw an overall conclusion (Musfiqon and Nurdyansyah, 2015), meaning that this approach refers to the attitude of students who investigate the phenomenon of new knowledge and combine it with previous knowledge (Kemendikbud, 2013). The scientific approach in the 2013 curriculum includes observing, asking, trying, processing, presenting, concluding, and creating for all subjects (Sudarwan, 2013). The purpose of the scientific approach is to provide students with experience so that the knowledge and materials obtained are more tested and accountable (Setiawan, 2019).

Learning with a contextual scientific approach is a learning concept that brings the real world into the classroom so that students can relate their knowledge to everyday phenomena (Hosnan, 2014). The component of contextual learning include constructivism, finding, asking, question, community learning, modeling, reflection, and authentic assessment (Sitiatava, 2013).

Biology is one of the subjects that requires scientific learning. Biology learning should provide a real learning experience for students (Lufri, 2007). The coordination system is one of the Biology materials studied in grades XI. This material is one of the materials that is difficult for students to understand. This material has a broad material coverage compared to other materials, where in this material, there are 4 sub-materials, namely the nervous system, endocrine system, sensory system, and psychotropic effects on the coordination system. Besides being broad, this material also contains many concepts so that most students just memorize it without understanding them. This is also consistent with the results of an interview with a biology teacher at SMAN 1 Tanah Pinem who stated that the coordination system is a material that is quite difficult for students to understand.

On December 2, observations were made at SMAN 1 Tanah Pinem. Based on observations, the curriculum used is the 2013 curriculum based on a scientific approach. The student textbook in learning biology class XI is accordance with the 2013 curriculum. The title of the book is Biology for class XI SMA Character Building Series with a Contextual Scientific approach published by Mediatama in 2016. The material for the Coordination system in the book is in chapter IX page 209.

Based on the SWOT analysis of the book on the coordination system material, it is known that the book is good enough to be used as a reference source for learning the coordination system. The book is equipped with instructions for observing pictures, schematics and also a discourse related to the coordination system. In the book, students are instructed to ask questions and collect data related to their observations. In addition, students are also given the opportunity to solve problems and conclude the results of solving these problems. In communicating the results of solving the problem, students are also given the opportunity to do so. Students are directed to present it in front of the class.

Based on the material aspects contained in the coordination system chapter, the truth and accuracy are still maintained. The material is presented in a

coherent and straightforward manner. The use of images is also in accordance with the level of student development and is equipped with clear sources.

However, the results of the analysis also show that there are some shortcomings or incompatibility with the scientific approach. This can be seen from the aspect of collecting information, which mostly directs students to only ask the teacher, not collect from other sources or references. This is shown on page 210, 215, 217, 224, and 233. In addition on association aspect, students are not directed to use their reasoning abilities. This can be seen from the instructions for solving problems, which are mostly asking the teacher. After the observation activity, there were no instructions to stimulate students to relate their knowledge to the problems observed.

Based on these shortcomings, it is necessary to make improvements to the book's weaknesses in the coordination system material. The concerns that may occur in the product as a result of the improvements made are changes to the learning curriculum and a less supportive learning environment.

The results of observations on the learning process show that biology learning has not applied aspects of the scientific approach. This is evident from the tracer that was carried out on 32 students who had previously received material on the coordination system. This tracer is implemented in the form of a google form. The results of the tracer showed that 84.4% of students said they were not instructed to observe activities and 72.9% of students said there was no instruction from the teacher to ask questions. Of the 32 students, 69.55% also said that they were not instructed to collect information, 85.4% did not carry out the reasoning/associating aspect and 68.8% said they did not communicate their observations.

The results of the initial observations also showed that students did not do much in the classroom during teaching and learning activities. This is obtained from the results of interviews with biology teachers at the school. The teacher explained that most of the students were not active in the class. Usually the active ones are those who have a fairly high rank. In addition, the teacher also explained

that they had never used other teaching materials to support the teaching and learning process.

Based on the preliminary study conducted, the book used did not fully contain aspects of the scientific approach. This may be a factor that causes students to say that the aspects contained in the scientific approach have not been implemented. Given that schools have never had other teaching materials about coordination system materials, the coordination system materials in student textbooks can be developed into teaching materials. One suitable teaching material is a module.

Module is a form of teaching material that is packaged and designed specifically and systematically based on a certain curriculum. The module contains the smallest learning unit that can be used independently to achieve learning objectives (Ditpem SMA, 2017). The Ministry of Education and Culture (2013) said that the module developed with a scientific approach was able to produce students who were productive, creative, innovative, and effective through strengthening integrated attitudes, skills, and knowledge. The module can help students learn because the module contains material, exercises, and evaluations that are packaged practically and interestingly (Ertikanto, 2017; Nisrokhah, 2016).

Several research results have explained the importance of modules based on a scientific approach. Sapitri (2017) has developed a module based on a scientific approach to the excretion system material. The results of the research show that the module can answer the problem of less than optimal learning in the excretion system material. The research also shows that the module can be used as an independent learning medium for students.

Other researchers (Setiyadi, 2017) have also developed modules based on a scientific approach to the material on ecological concepts. The test results show that the module can improve students' cognitive abilities. This is because in the module there are activities that support students to be actively involved in conducting experiments, analyzing data or information, and discussing the results of observations or analyses to conclude. The use of modules based on a scientific

approach to plant tissue material has also been shown to be able to increase students' learning motivation (Roslina, 2020).

Based on the three studies above, the module based on a scientific approach to the coordination system material will be developed. In this study, module can be seen the effectiveness from students' abilities in aspects of the scientific approach which include observing, asking questions, gathering information, associating/reasoning, and communicating. This study aims to produce a biology module based on a scientific approach to the material of the coordination system for students to support the success of learning biology following the rules of the 2013 curriculum.

1.2. Identification of Problems

Based on the background of the problems that have been stated, the problems that can be identified are as follows.

1. The information contained in the biology book on coordination system material not fully contain components that are suitable with the contextual scientific approach.
2. The majority of students do not implement aspects of the scientific approach in learning biology.
3. In the process of learning biology in the classroom, most students are passive.

1.3. Formulation of the Problem

Based on the limitations of the problems that have been described, the formulation of the problem in this study are:

1. How is the feasibility of scientific approach based module on coordination system material according to the material expert?
2. How is the feasibility of scientific approach based module on coordination system material according to learning experts?

3. How is the feasibility of scientific approach based module on coordination system material according to design experts?
4. How is the feasibility of scientific approach based module on coordination system material according to the Biology teacher?
5. How the respon of students to the scientific approach based module on coordination system material?
6. How effective is the use of the scientific approach based module on coordination system material?

1.4. Scope of problem

So that the research does not deviate from the research objectives, it is necessary to limit the problem, namely as follows.

1. The module development uses a 4D instructional development model with the stages of define, design, development, and dissemination.
2. The module was developed based on the 5M by scientific approach (observing, asking, gathering information, associating/reasoning, communicating).
3. The feasibility assessment of the module according to the material expert is limited to aspects of the feasibility of the content (compatibility between standart competency and core competency, material accuracy, material updates, encouraging curiosity), presentation feasibility aspects (presentation techniques, presentation support, learning presentation, and coherence and coherence of the flow of thought) and linguistic aspects (clearness, communicative and dialogical and interactive, conformity with developments, conformity with Indonesian language rules, use of terms and symbols).
4. The feasibility of the module according to learning experts is limited to aspects of the up-to-date material and components of scientific learning (observing, asking questions, gathering information, associating, communicating).

5. According to design experts, the feasibility of the module is limited to aspects of module size, cover layout, cover typography, module illustrations, module content layout, and module content illustrations.
6. The biology teacher's response to the module is limited to the aspect of its ease of use in the coordination system learning activities in terms of appearance, the feasibility of presenting material, scientific learning components, and language.
7. Students' responses to the module were limited to the attractiveness aspect of the module in motivating students to learn the coordination system in terms of module display, instruction presentation, and learning activities presented.
8. The effectiveness of the module is determined based on the N-gain score and the value of the student's scientific ability.

1.5. Research purposes

Based on the existing problems, the purpose of this research is as follows.

1. Knowing the feasibility of scientific approach based module on coordination system material according to material experts.
2. Knowing the feasibility of scientific approach based module on coordination system material according to learning experts.
3. Knowing the feasibility of scientific approach based module on coordination system material according to design experts.
4. Knowing the feasibility of scientific approach based module on coordination system material according to the Biology teacher.
5. Knowing the respond of students to scientific approach based module on coordination system material.
6. Knowing the effectiveness of using scientific approach based module on coordination system material.

1.6. Benefits of Research

The benefits of doing this research are:

1. Theoretically, research can be used as reference material to study more deeply about the development of modules based on a scientific approach.
2. Practically,
 - a) As a researcher, adding experience in developing teaching materials, especially modules as a provision to become prospective professional educators in the future.
 - b) For schools, research results can be used as a reference for teaching materials on coordination system materials.
 - c) For teachers, the developed module can be used as teaching material on the coordination system material in accordance with the scientific approach.
 - d) For students, the resulting module can help students learn the coordination system material independently or in groups.

1.7. Operational Definition

- a. The module in this study was developed based on a scientific approach with a 4D development model by Thiagarajan (1974) which consists of 4 stages, namely define, design, develop, and disseminate.
- b. The scientific module of the coordination system material is a special teaching material on the coordination system material that is packaged using scientific components in it. These teaching materials are packaged systematically and specifically using language that is easily understood by students.